

SOLID POWER

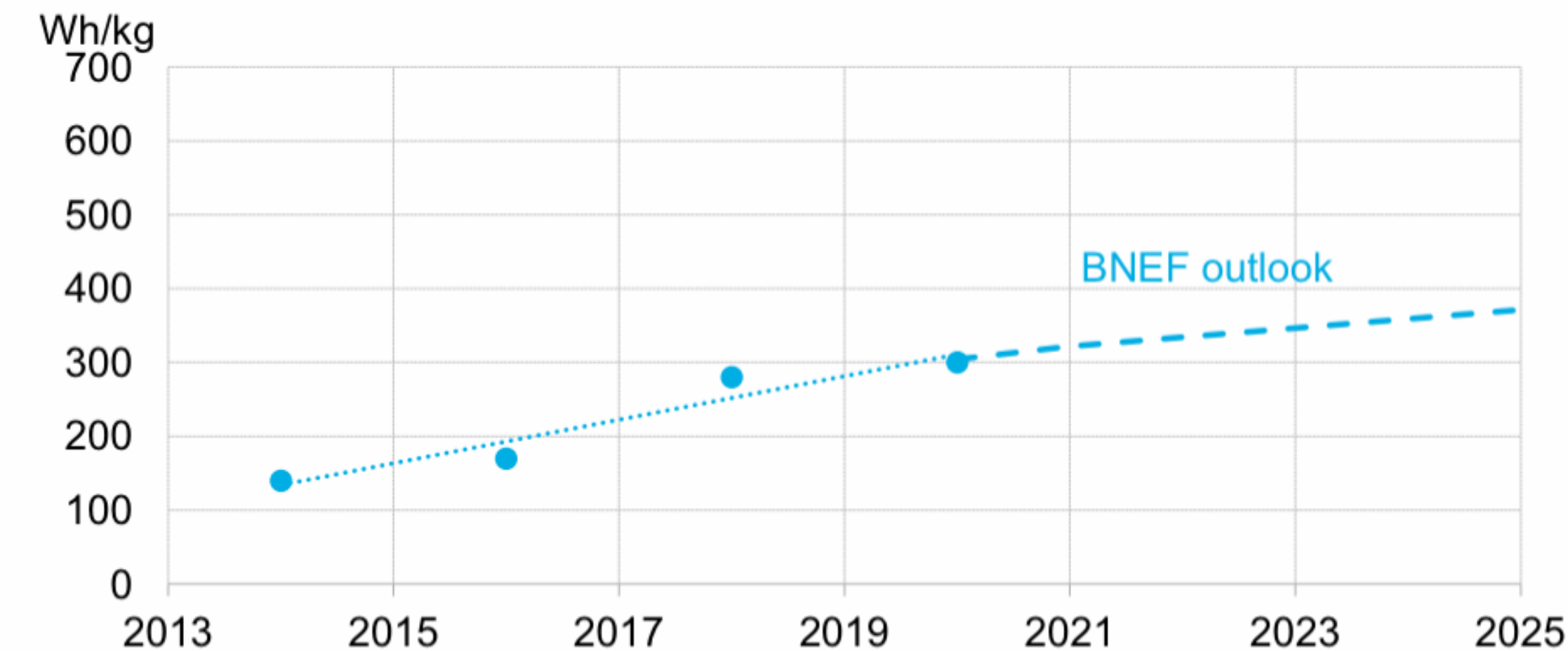
The Leading Developer of All
Solid-State Batteries (ASSB) for
Mobile Power Markets

NASA EPFD Battery Day – November 30, 2020

Dean Frankel, Supply Chain– dean.frankel@solidpowerbattery.com

MARKET OPPORTUNITY

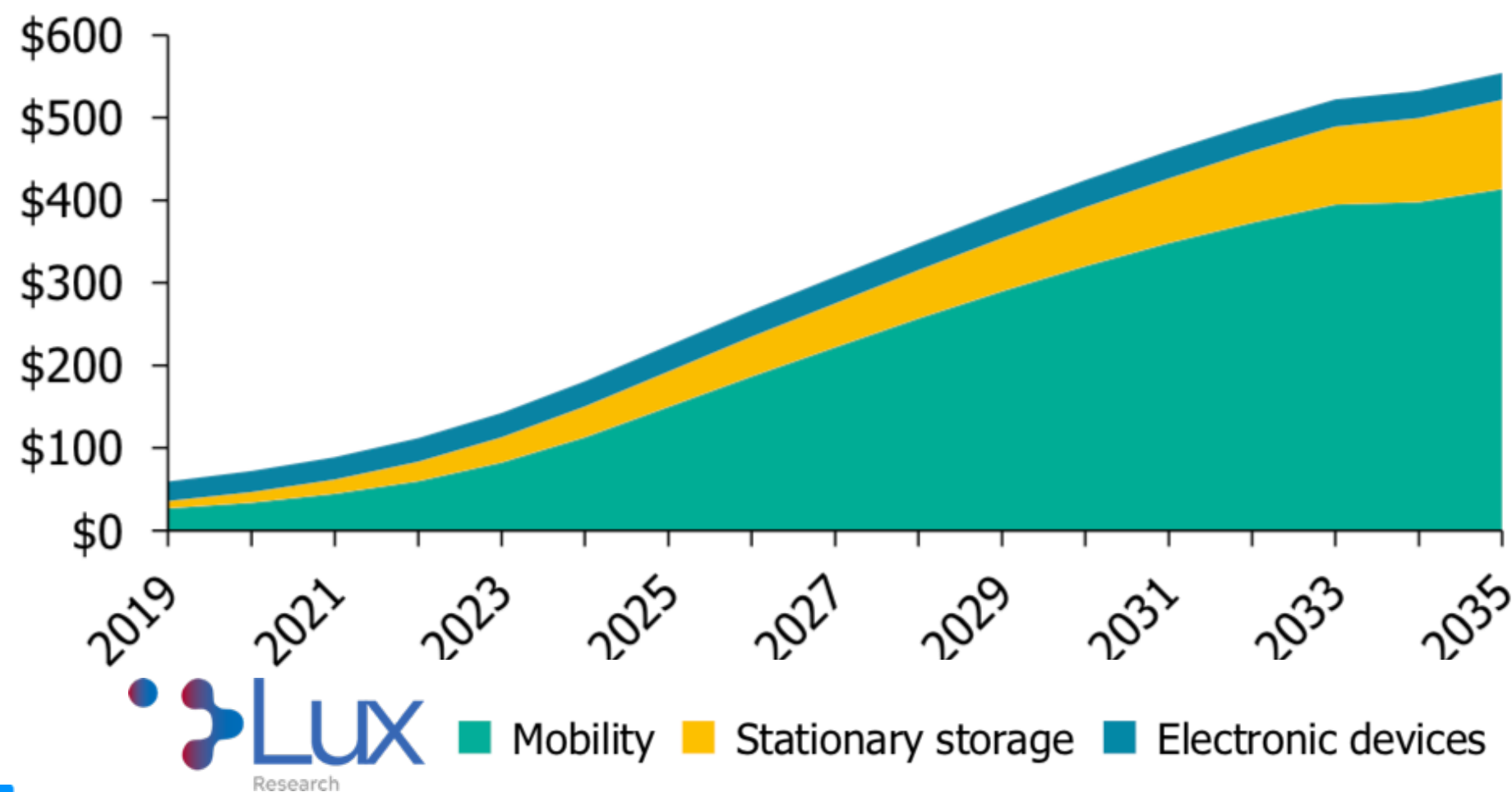
Li-ion Energy Density Projections



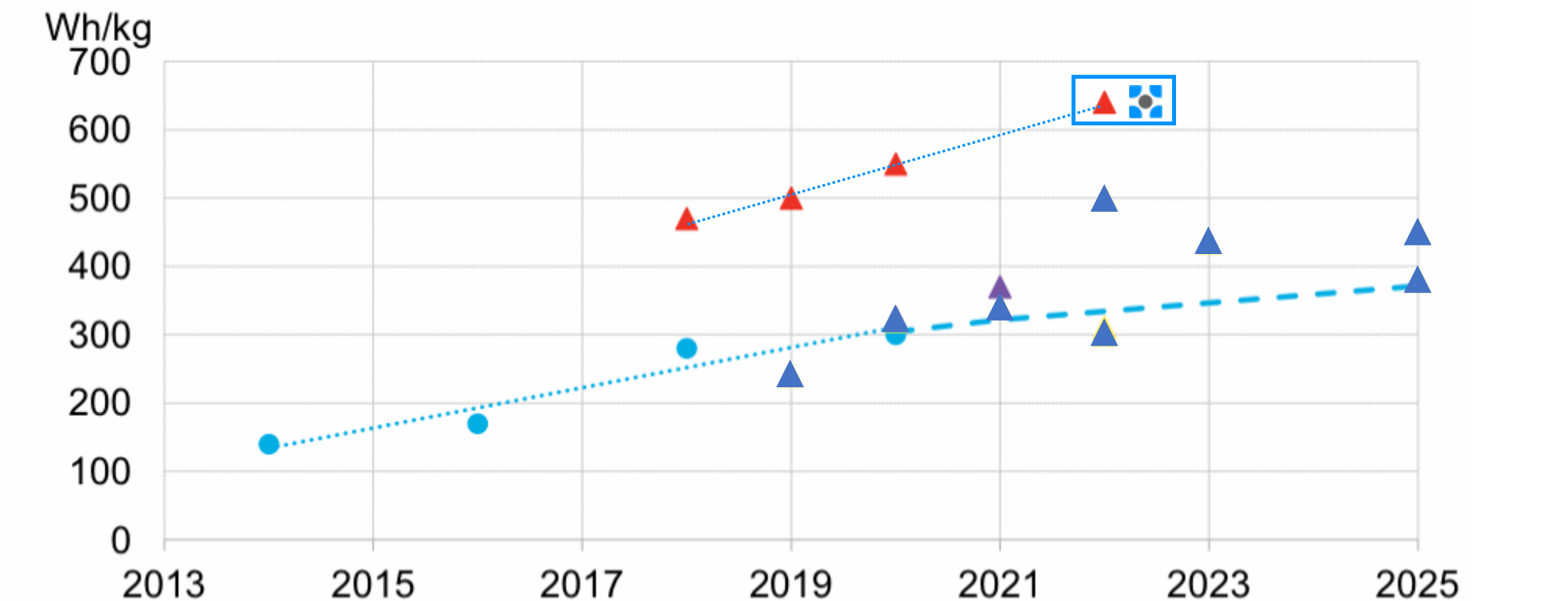
Source: BloombergNEF, VW ● Standard NMC

Total market projections

Energy storage annual revenue (\$ billions)



Lithium Anode & Solid-State Solution



Source: BloombergNEF, VW ● Standard NMC ▲ Silicon anodes ▲ Solid-state ▲ Lithium anodes

Strong market demand for high energy batteries
(Wh/kg & Wh/L) at cost competitive prices



***“THIS GROWTH WILL BE DRIVEN BY THE
COMMERCIALIZATION OF SEVERAL KEY INNOVATIVE
TECHNOLOGIES, INCLUDING SOLID-STATE.”***

Lux Research
Global Energy Storage Market Forecast 2019

SOLID POWER OVERVIEW

Leading developer of sulfide-based all solid-state batteries (ASSB):

**Higher energy vs.
Li-ion**

**Compatible with existing Li-ion
manufacturing**

**Inherently safer vs.
Li-ion**

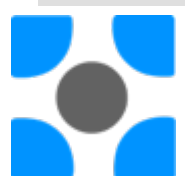
**Lower pack-level costs due to
design simplicity**

“Clients should consider Solid Power as a global leader in the innovation race to develop solid-state batteries with metallic lithium anodes”



2019's Hottest Innovation Topics & Best Tech Start-Ups

“Solid Power is clearly one of the most advanced solid-state players, with a 10MWh manufacturing facility recently launched to provide prototypes to partners for testing.”



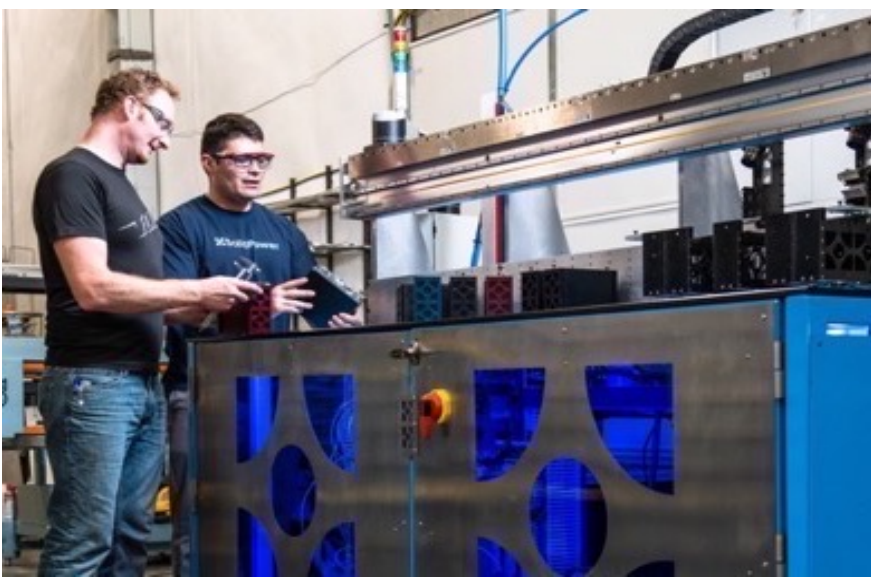
SOLID POWER AT A GLANCE

Overview



Industry-leading developer of sulfide-based all solid-state batteries (ASSB) for mobile power applications.

MWh-Scale Production



Operating MWh-scale roll-to-roll all solid-state battery prototype pilot production line with validation by multiple OEMs.

OEM JDAs



Ongoing, non-exclusive, joint development agreements (JDAs) with BMW & FORD among others.

Backed By Prominent Investors



Two Product Groups



Energy-dense solid-state cells



Sulfide solid electrolytes



ADVANTAGES AT EVERY STAGE OF ASSB PRODUCTION

Li₂S precursor



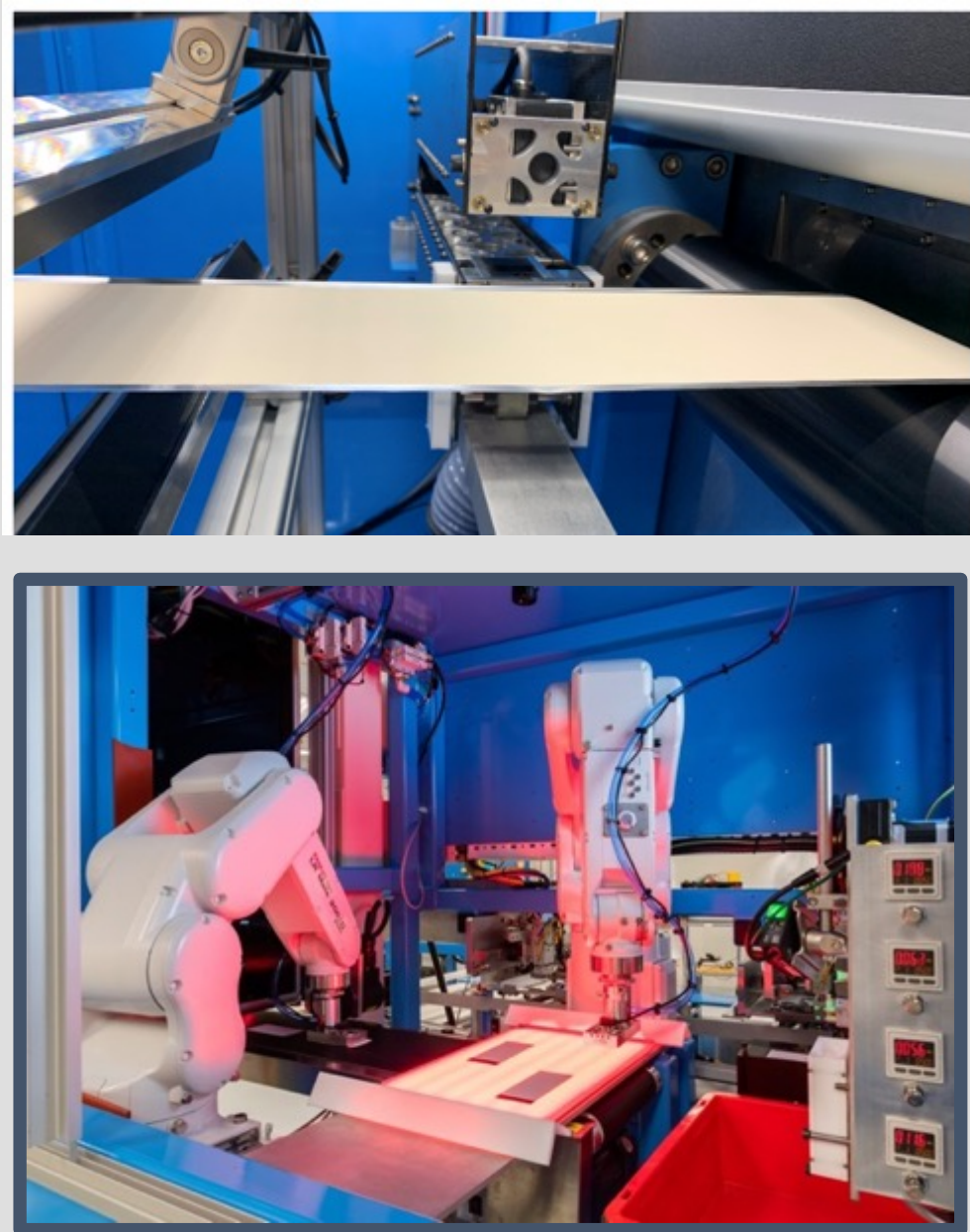
Li₂S precursor developed in-house and via partners for low cost and optimized for mass production of electrolyte and cells

Electrolyte



Best all-around solid electrolyte materials produced using low-cost scalable processes

Production



Pilot scale production using the same equipment as conventional Li-ion to quickly enable low-cost GWh-scale production

Pouch cells



Multi-Ah pouch cells deliver >50% energy advantage over Li-ion while also being inherently safer



SOLID POWER'S ASSB PLATFORM: MULTIPLE ASSB VARIANTS

Core Technology: Solid Electrolyte ^{1,2,3}

Unique variants tuned as electrolyte, catholyte and anolyte products



Intercalation-Type Cathodes ^{1,2}

Industry-standard & commercially mature



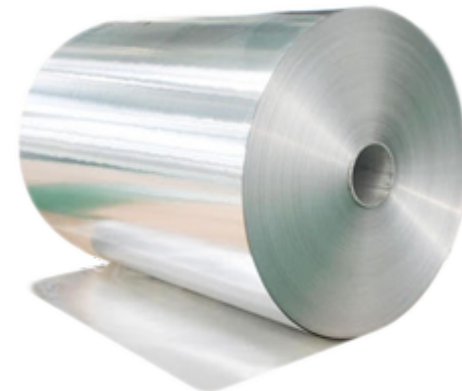
Conversion-Type Cathodes ³

Ultra low cost & high specific energy



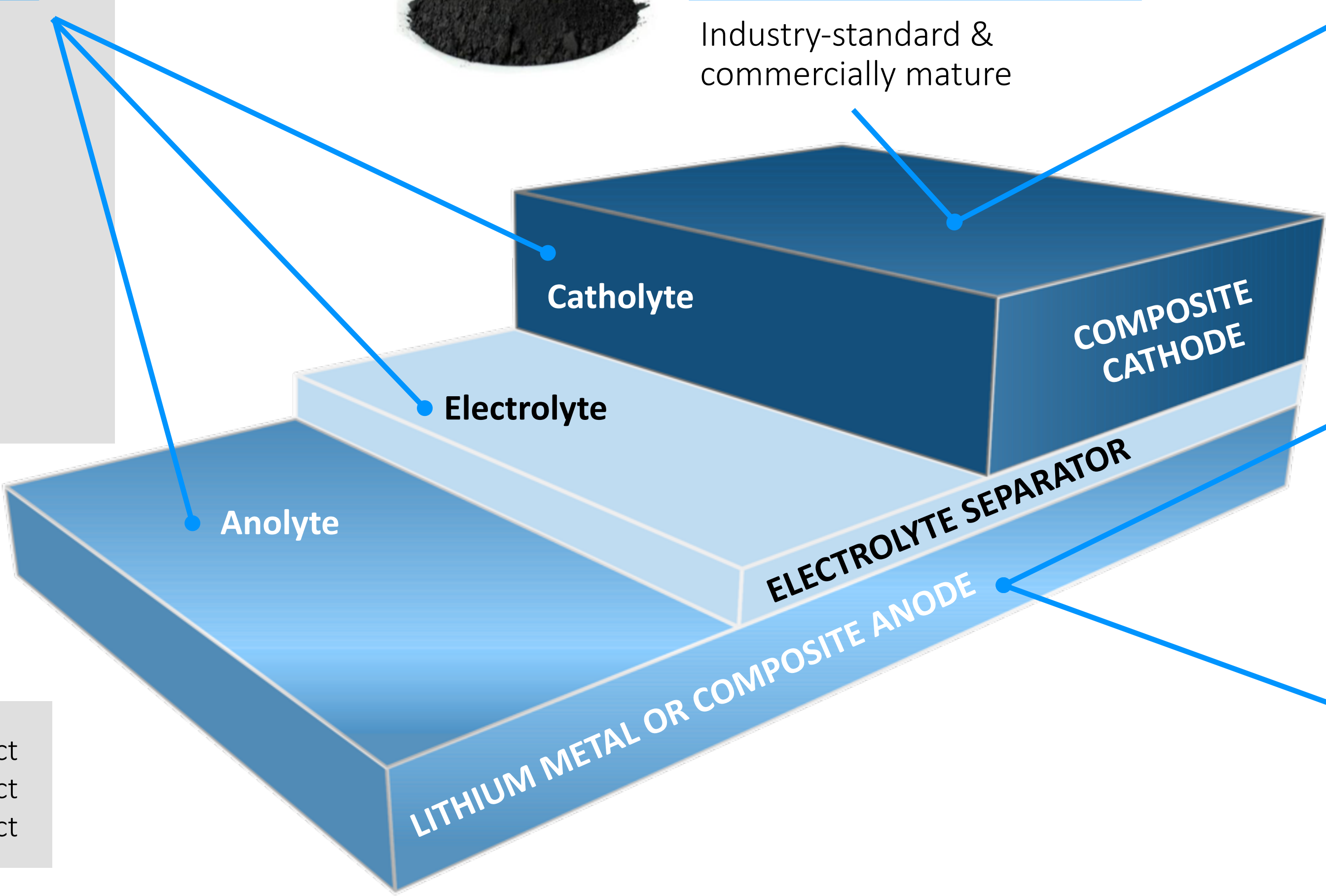
Si-Based Anodes ²

High charge rates



Lithium Metal Anode ^{1,3}

Ultra high energy



¹ Solid Power's v1 Cell Product
² Solid Power's v2 Cell Product
³ Solid Power's v3 Cell Product

Flexible platform allows use of alternative anode + cathode materials
to suit specific performance requirements

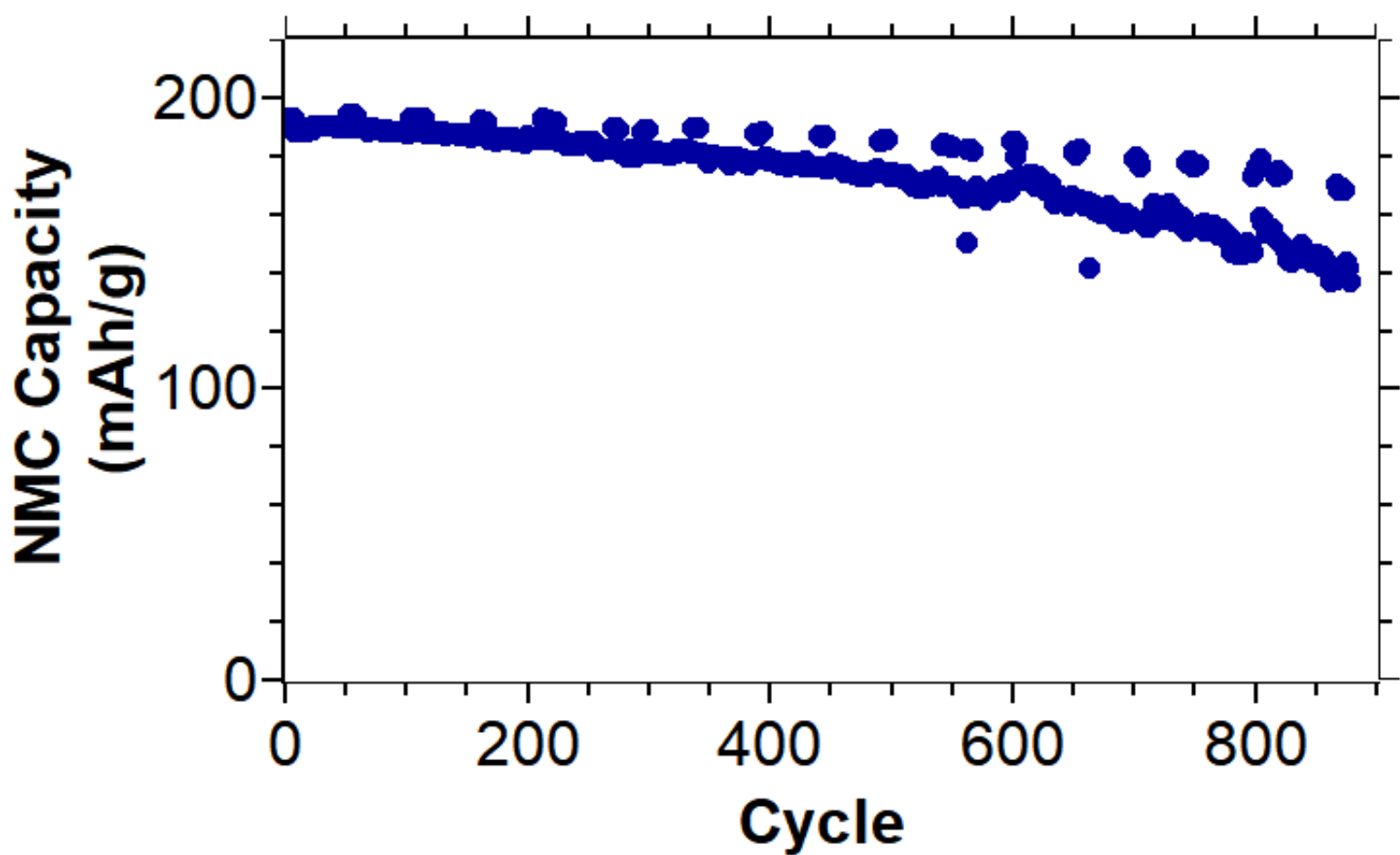


SOLID POWER'S FLEXIBLE ASSB PLATFORM

NMC + Li-Metal ASSB

V1 cell product

(Production scale today)

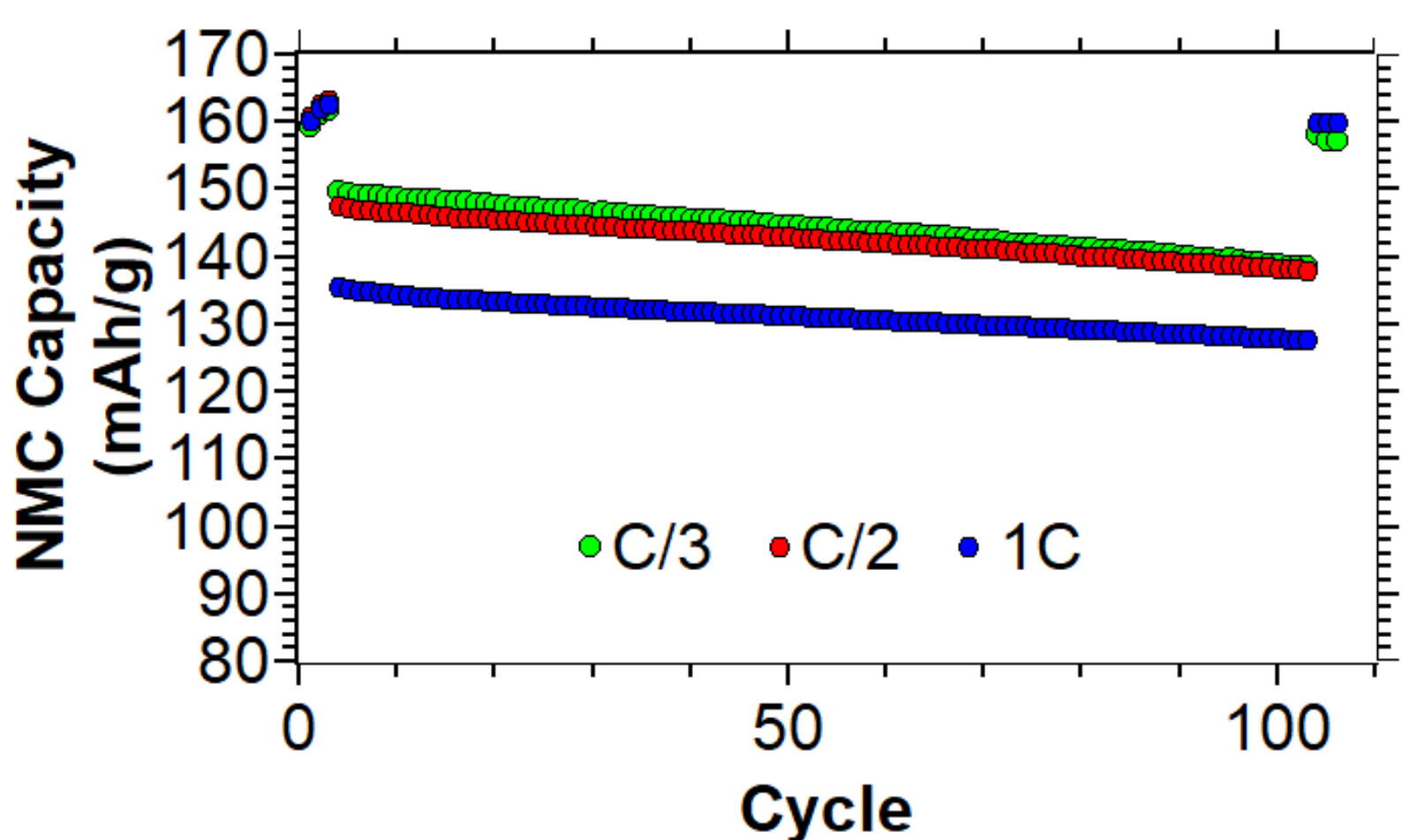


- 350 Wh/kg demonstrated on production-line cells
- Core focus for mobility applications

NMC + Silicon Anode ASSB

V2 cell product

(Production in late 2020)

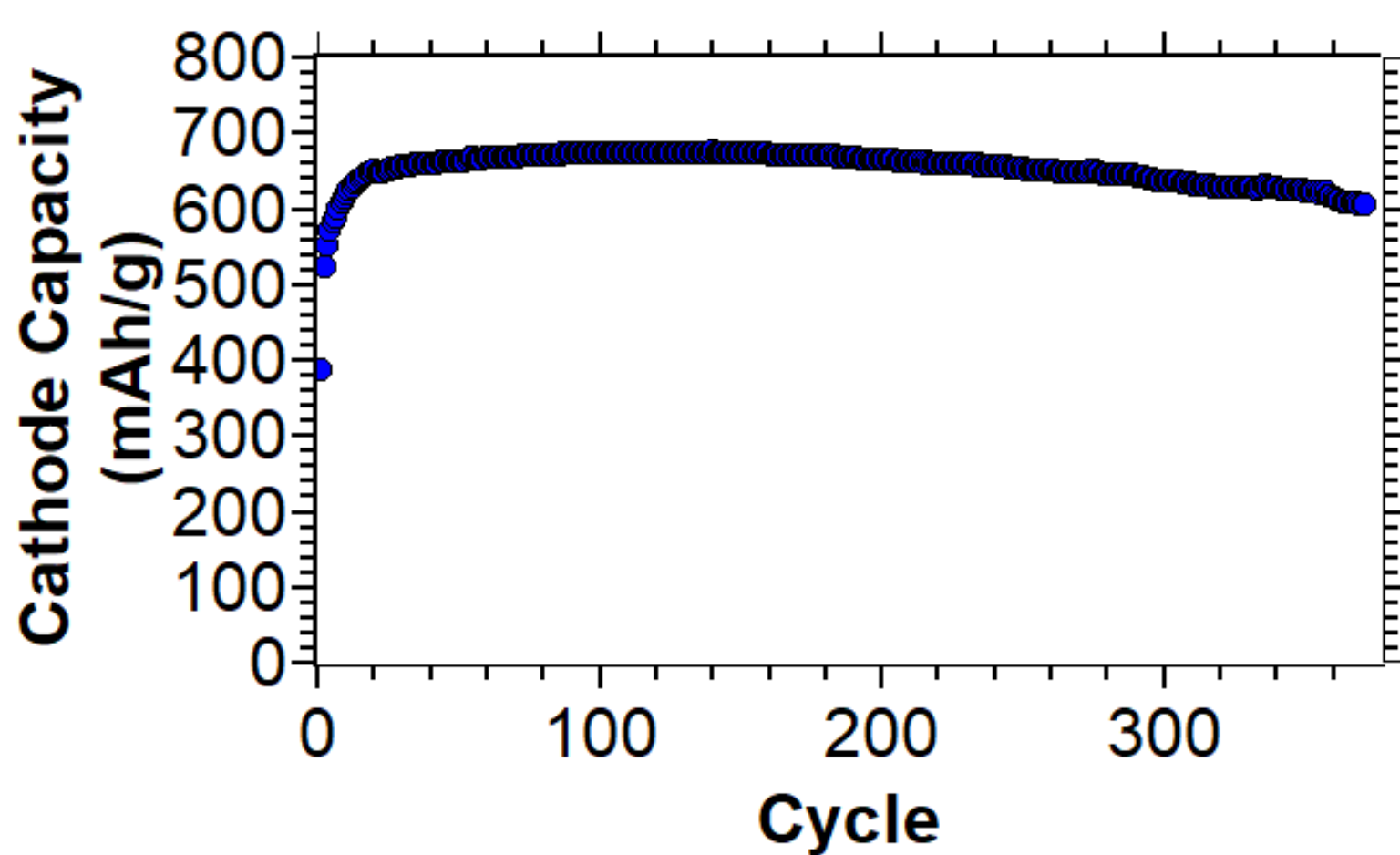


- 340 Wh/kg demonstrated in hand-built pouch cells with quick-charge capability and excellent low temperature performance
- Promising for consumer electronics as well as mobility

Conversion Reaction Cathode + Li Metal ASSB

V3 cell product

(Production TBD)



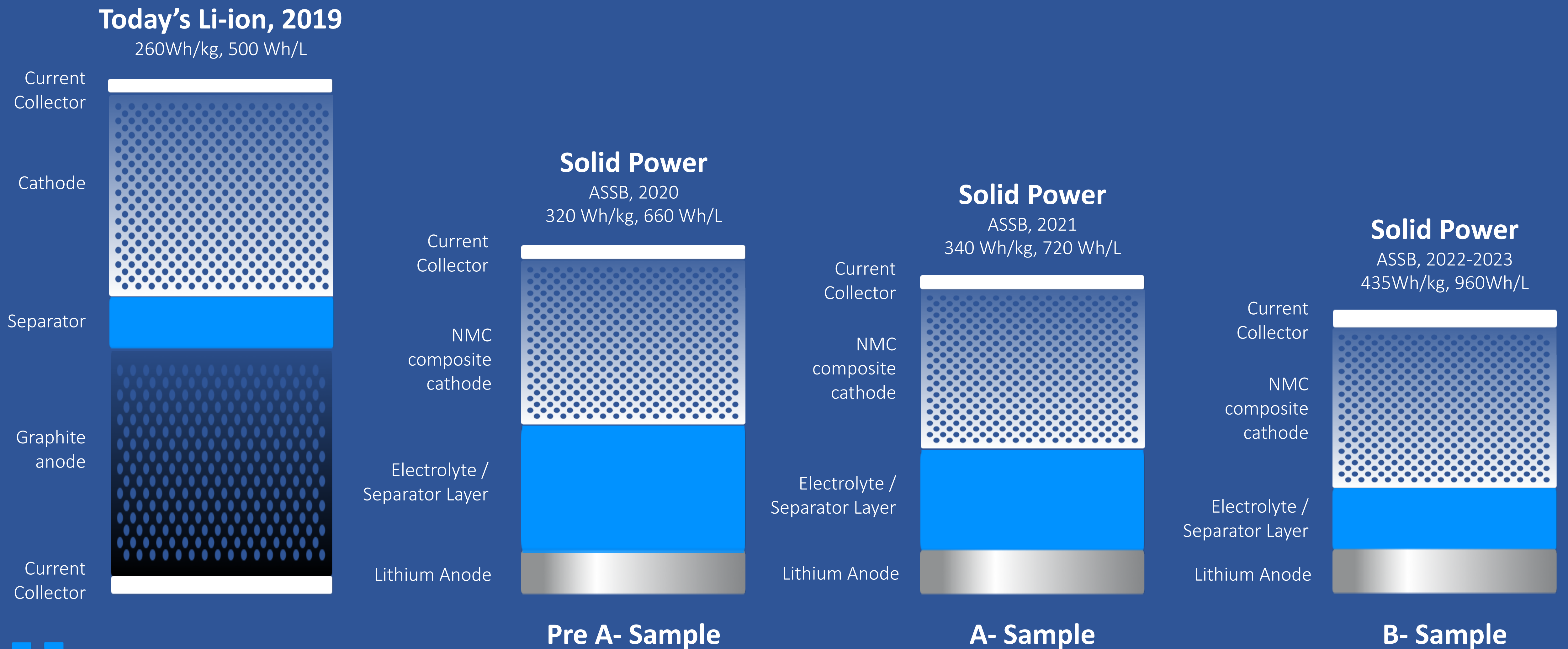
- FeS₂-based cathodes show significant advantages in cost, energy density and safety over NMC
- Mobility-relevant cycle is a longer-term challenge, but attractive for niche applications in near-term

Nearly **any future material** developed for Li-ion can be integrated using the same equipment and processes as Solid Power's core materials



SOLID POWER'S TECHNOLOGY ROADMAP

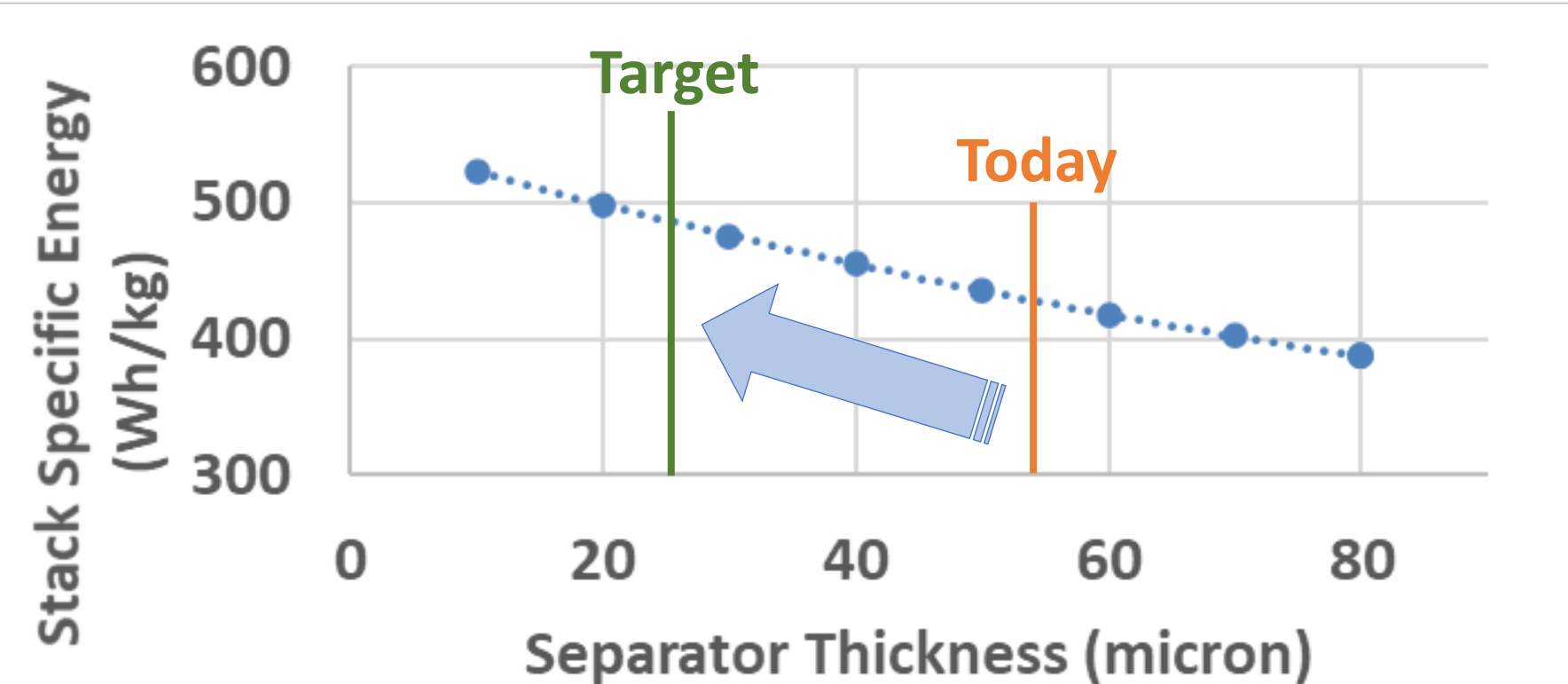
Improvements in cell-level energy achieved through cell design optimization



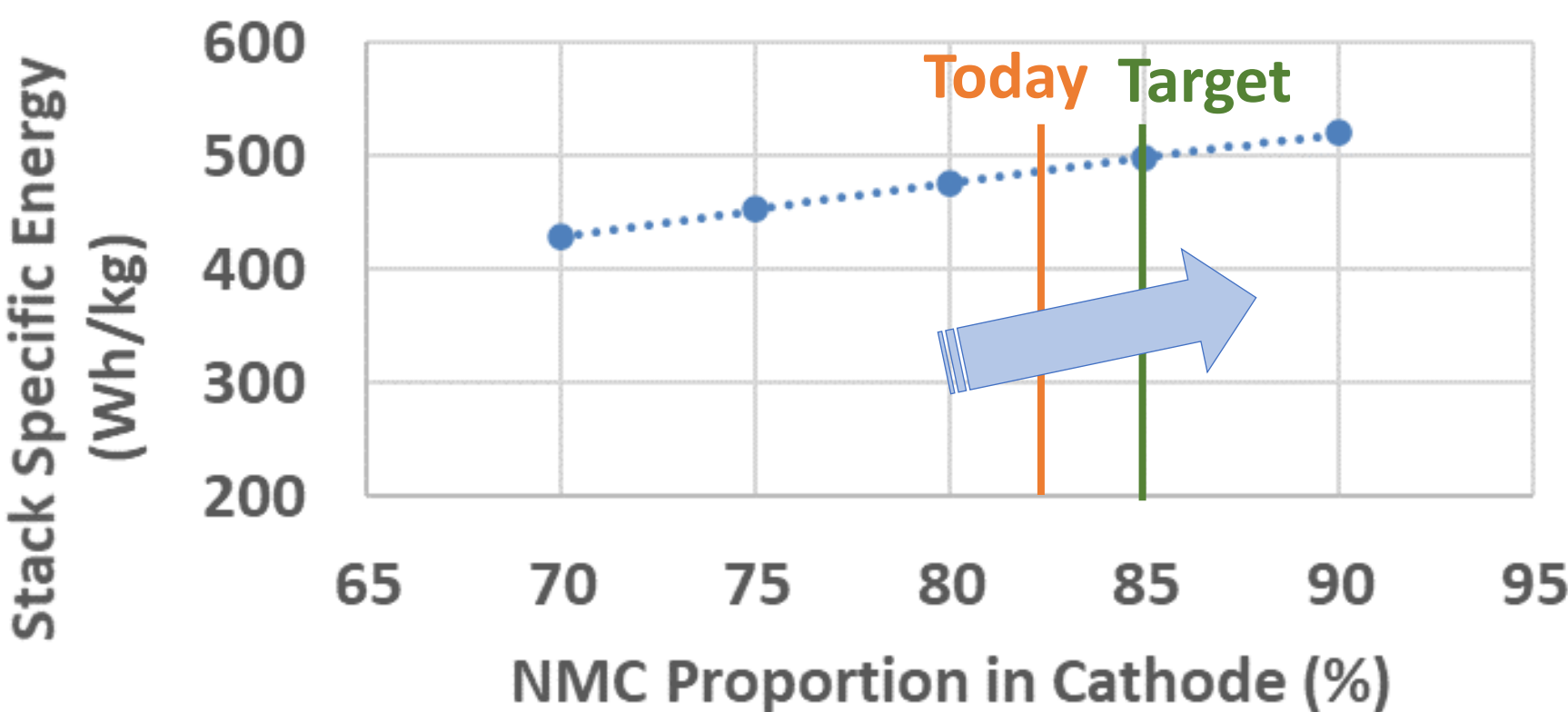
ENERGY TARGETS ONLY REQUIRE CELL DESIGN OPTIMIZATION

Path to Li-NMC cell with 470 Wh/kg & 1000 Wh/L

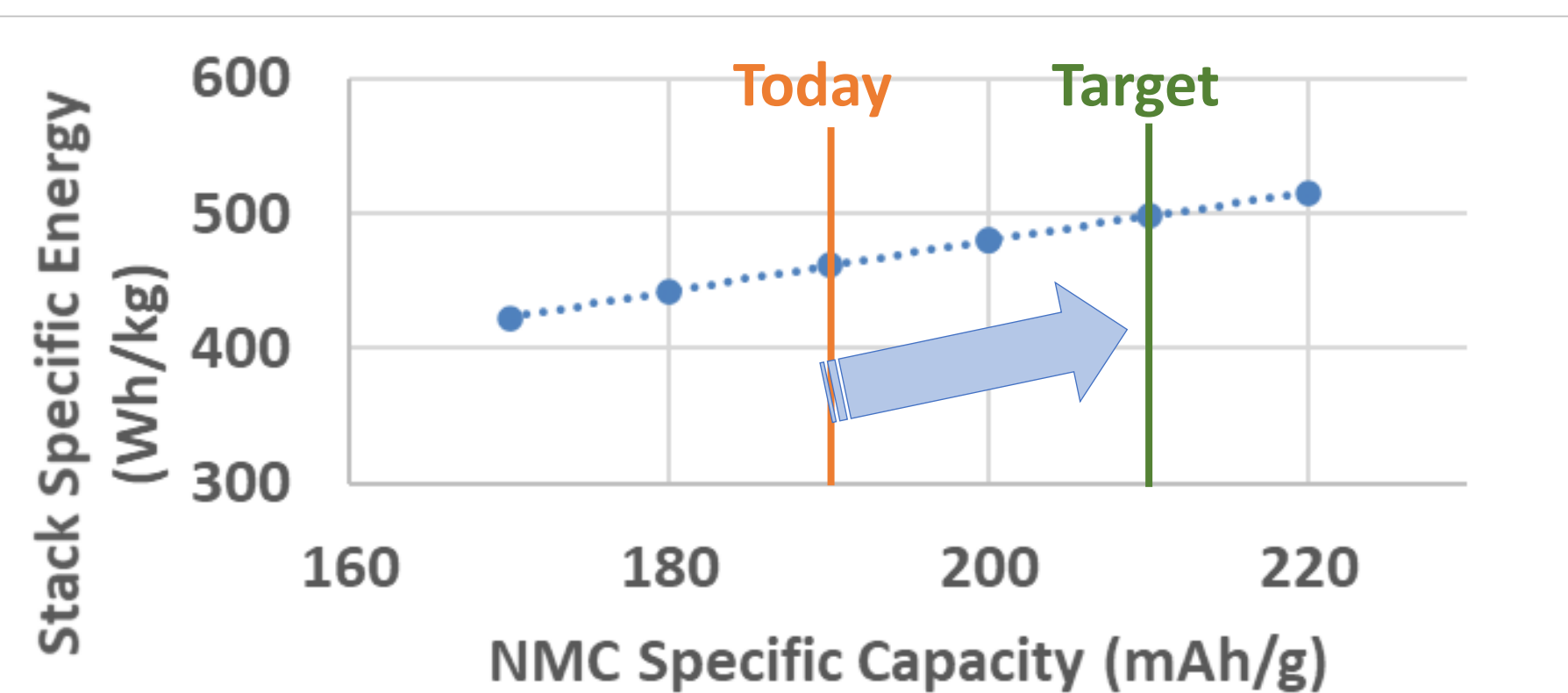
Reduced Electrolyte- Separator Thickness



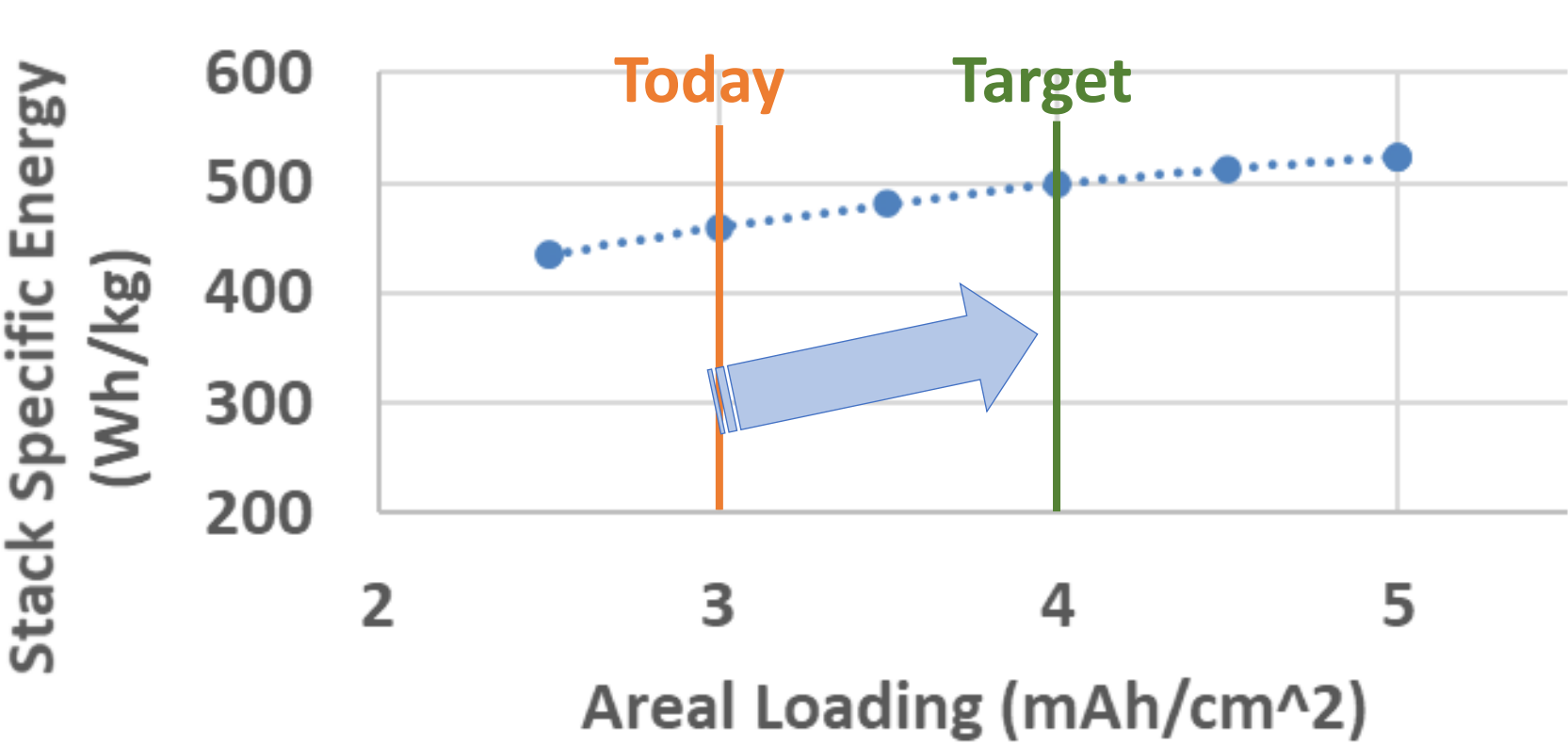
Increased NMC % in Cathode



Increased Cathode Specific Capacity



Increased Cathode Loading



COST BENEFITS OF SOLID-STATE

Higher Energy Density vs. Li-ion

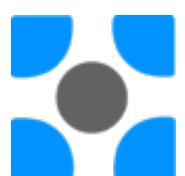


Inherently Safer vs. Li-ion

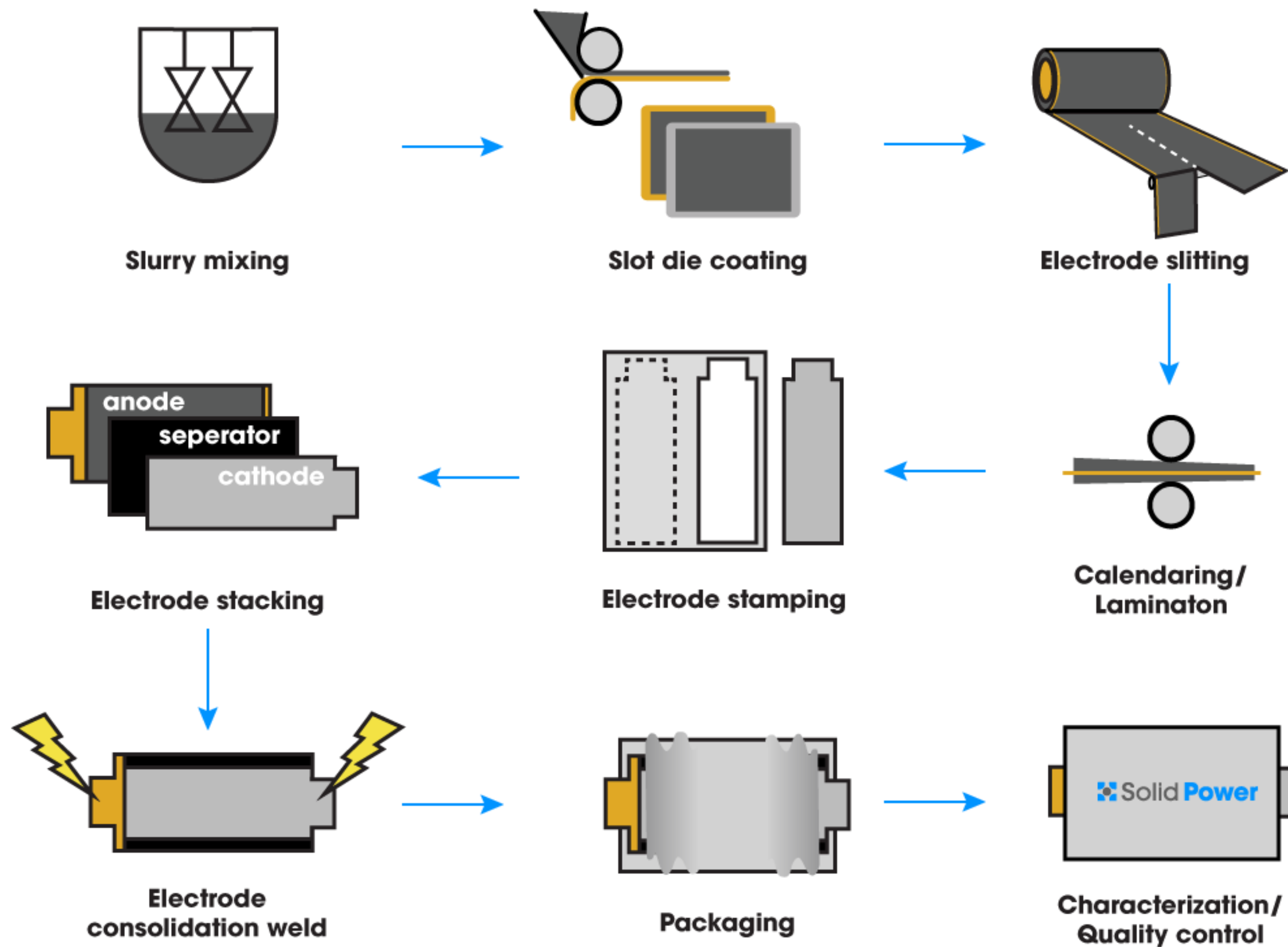


Solid Power Cost Advantages

- Higher energy density allows for decreased cost or increased range
- Improved safety allows for pack simplification and use of larger cells / higher energy chemistries
- Compatible with well-established and emerging Li-ion production equipment and processes
- Elimination of expensive production steps such as cell formation



SOLID POWER'S MWh-SCALE PROTOTYPE PRODUCTION LINE



- Solid Power's cell manufacturing processes are almost identical to current Lithium-ion
 - Electrolyte filling removed
 - Complicated formation steps replaced
- Dry room environment is compatible with existing Lithium-ion battery production infrastructure
 - Dew point spec of -40 °C
- Solid Power leverages current Li-ion manufacturing infrastructure to ensure minimal CAPEX investment to launch an all solid-state cell



Value proposition:
Ability to quickly deploy solid-state technology for early adaptor platforms

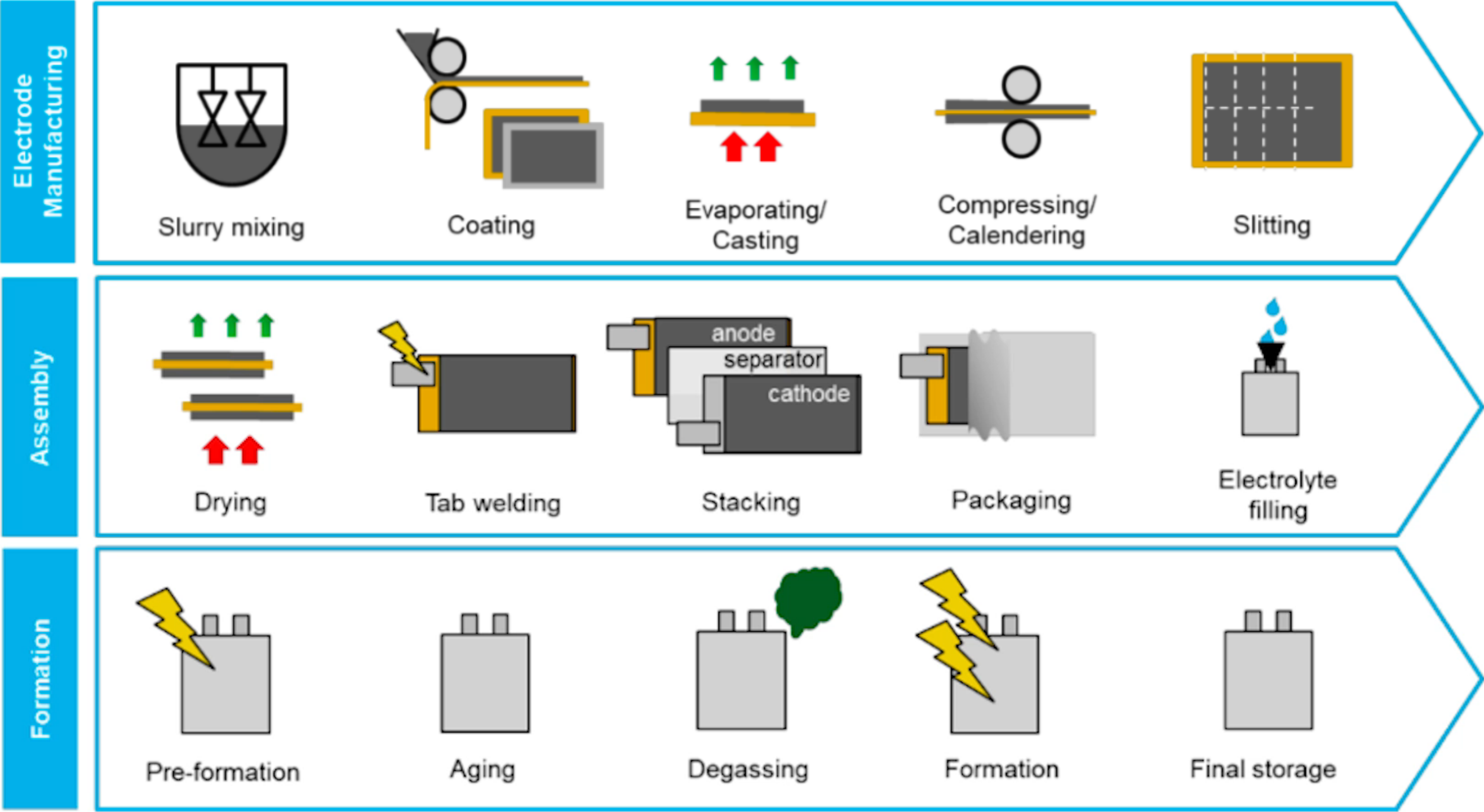
COMPARISON TO LI-ION PRODUCTION

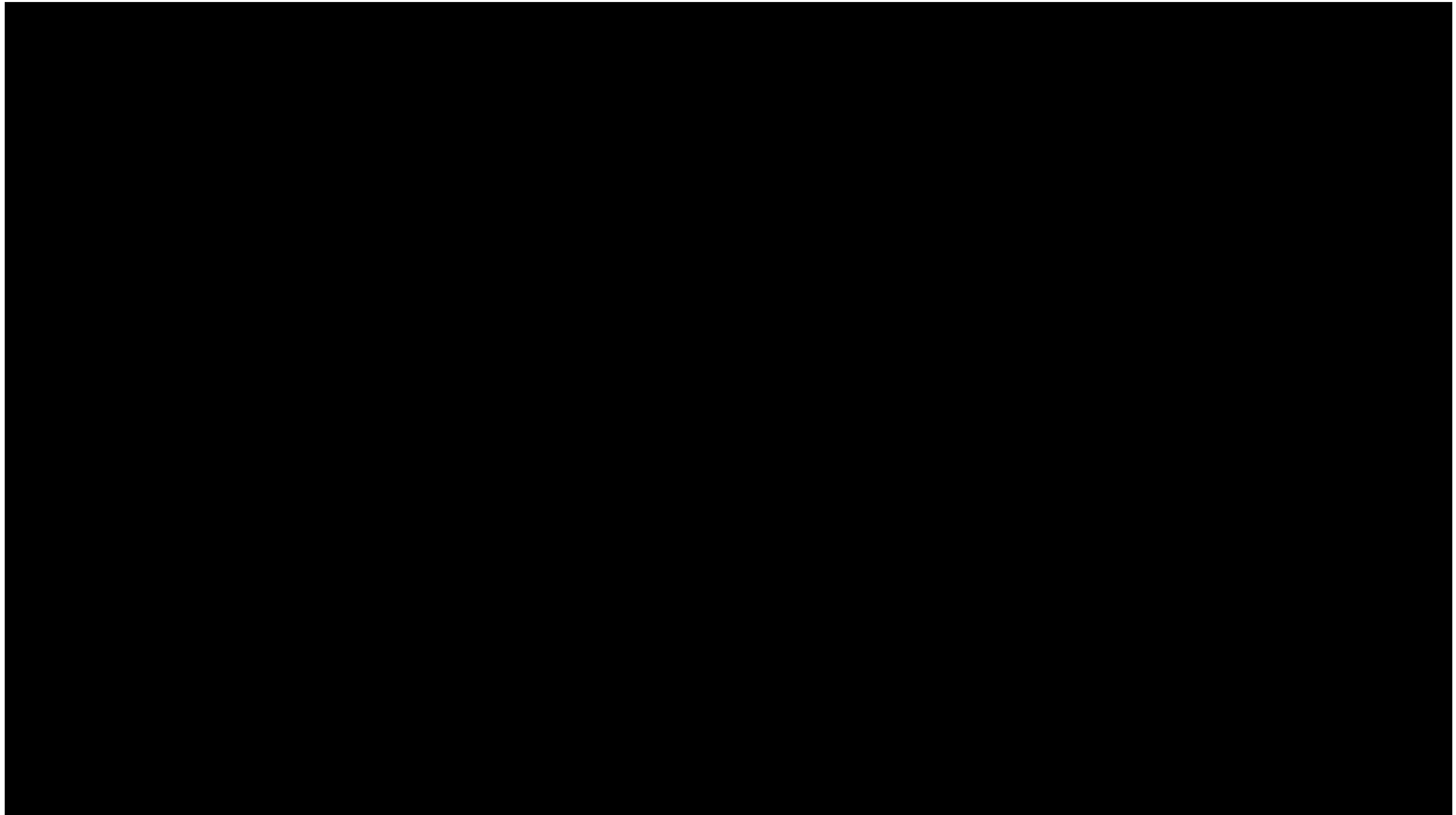
Electrode manufacturing is identical

Electrolyte fill eliminated

Almost entire formation process eliminated!

Lithium-Ion Manufacturing





2020 Q2-Q4 ACHIEVEMENTS

Manufacturing

MWh-scale roll-to-roll production line fully operational

2020 production rate targets met for both cell and electrolyte

Series A thesis validated:

- Solid Power's ASSBs can be manufactured using Li-ion industry-standard processes and equipment
- Cell performance improvements can be achieved via process improvements (e.g., slurry, coating, calendaring, etc.)

Production trials on 20Ah pre A-Sample initiated – first 20Ah cells built in November

Performance

Cell and electrolyte material performance validated via external parties.

Further external party validation ongoing

Near room-temp. and high rate (up to 5C discharge at 70°C) performance demonstrated on production-line cells

Superior calendar life data vs. Li-ion indicates pack-cooling unnecessary

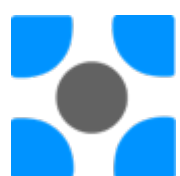
Customer Deliverables

As of end of November, >450 cells delivered to partners with several having already validating in-house data.



Recipient breakdown:

- Seven auto OEMs
- 4 Tier 1 cell suppliers
- An additional 3 auto OEMs are planned for delivery to in Q3 & Q4



THANK YOU

